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Integrated Training Solutions: An Effective Tool to Synchronize People and Maintenance

Abstract

Operating and maintaining today's ships in an efficient, safe, and cost-effective manner in the face of manning reductions and dwindling budgets requires well-planned and integrated training solutions. There are numerous examples of what happens and how costs increase in the absence of training. This paper focuses on the positive outcomes of training and how it contributes to reducing Total Ownership Cost (TOC).

An effective training program will enhance material readiness and reduce TOC by educating personnel to understand and recognize the importance of maintenance and its relationship to material readiness and reduced TOC. To be valid and effective, the training solution must educate personnel with regard to maintenance practices; safety requirements; causes and effects (including environmental impact) of maintenance failures/shortcomings; and proper procedures, processes, and materials for accomplishing maintenance. The training solution is most effective if it offers the means by which the student can practice and apply the training in a safe environment followed by immediate application on the job. An integrated training solution provides student-centric training that can be offered using multiple methods featuring current technologies and best practices. It can be delivered as instructor-led, computer-aided instruction in a classroom/laboratory environment or synchronous/asynchronous interactive multimedia instruction available to any student with access to a computer and Navy Knowledge Online (NKO) at home, in a schoolhouse, or afloat.

An excellent example of a successful integrated training solution is how the Navy's Assault Craft Unit (ACU) community designed and implemented comprehensive corrosion control training as its first line of defense in combating corrosion and its long-term effects on the Landing Craft, Air Cushion (LCAC). In this case, the blended solution features learner-centric, instructor-facilitated training with a hands-on laboratory application as well as reach-back/refresher training using asynchronous web-based e-Learning that is student-paced and available anywhere, anytime on NKO. This training is topical, domain-focused, just-in-time, and provided on the job.

To mitigate the inherent risks of manning reductions and dwindling budgets while achieving the desired levels of material readiness and controlling TOC, it is essential that the maintenance toolbox contain well-designed and engaging integrated training solutions that balance training costs in terms of return on investment (ROI).

Introduction

This paper will discuss the impact of training as an important maintenance tool that synchronizes people with maintenance practices. Trained personnel are capable of operating systems and equipment in a safe and effective manner that optimizes equipment performance while minimizing premature equipment failure. Sailors that are trained to perform maintenance minimize downtime, reduce rework, and contribute to controlling TOC.

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14. ABSTRACT
Operating and maintaining today?s ships in an efficient, safe, and cost-effective manner in the face of manning reductions and dwindling budgets requires well-planned and integrated training solutions. There are numerous examples of what happens and how costs increase in the absence of training. This paper focuses on the positive outcomes of training and how it contributes to reducing Total Ownership Cost (TOC).

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Maintenance

As illustrated in Table 1, maintenance and maintenance support activities account for approximately 58% of the Navy's 2011 budget estimate for ship operations, yet training accounts for about 6% of the budget.

Table 1. Department of the Navy's Fiscal Year 2011 Budget Estimate for Ship Operations		
Budget Line Item	**Budget Activity**	**FY 2011 Total Request**
1B1B	Mission and Other Ship Operations	$4,848,378,000
1B2B	Ship Operations - Support & Training	756,455,000
1B4B	Ship Depot Maintenance	6,028,226,000
1B5B	Ship Depot Operations Support	1,344,844,000
	Total Ship Operations	*$12,977,903,000*

Speaking to the Surface Navy Association in January 2010, Vice Admiral Kevin McCoy, Commander of the Naval Sea Systems Command, said an aggressive new program to improve ship maintenance is being developed for the Fiscal Year 2012 budget. The Admiral told Navy leadership they must spend more money now on maintenance if they are going to meet their goal of increasing the size of the Fleet in the future, because "70 percent of the 313-ship Navy that is going to exist out in the future, we already own" (Kreisher, 2010).

Since maintenance plays such an important role in Fleet readiness, it is important to note that labor costs account for 54.8 percent of the cost of maintenance. Table 2 and Figure 1 show the relationship of labor dollars to material dollars for non-Depot/intermediate-level maintenance for the Navy's 2011 budget. *(NOTE: Organizational-level maintenance dollars are reflected in Ship Operations.)*

Table 2. Department of the Navy's Fiscal Year 2011 Budget Estimate for Non-Depot / Intermediate Level Maintenance Costs	
Labor Costs	$532,181,000
Material Costs	$439,401,000
Total	*$971,582.000*

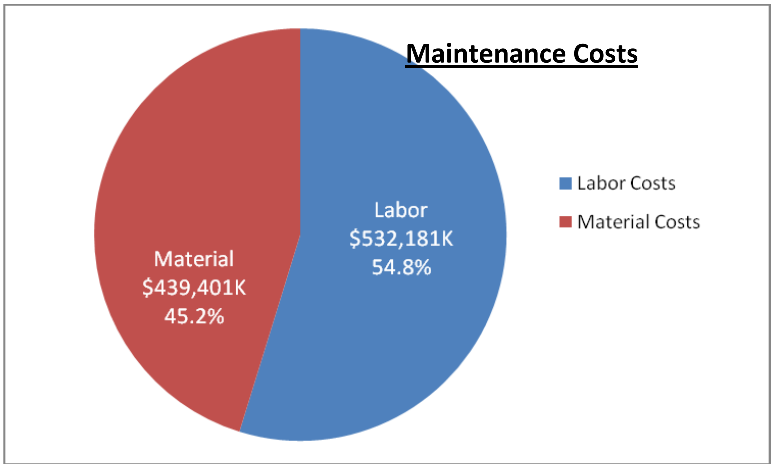

Figure 1. Non-Depot / Intermediate-Level Maintenance Costs (Budget, 1B4B, Page 6 of 9)

As the single largest component of maintenance costs is the people who maintain the equipment, it is important for these people be properly trained to accomplish the maintenance. An effectively trained workforce is important to help control maintenance costs through:

(1) Increased readiness as a result of less equipment downtime

(2) Longer equipment life

(3) Successful first-time repairs with less rework

An effective training program is vital as a fundamental part of a comprehensive, cost-effective maintenance program that will efficiently meet the needs of the 21st century Fleet.

Training

Most people agree on the importance of a good training program. However, training is often the first program cut when looking for ways to save money. In spite of manning reductions and decreasing budgets, it is important that sailors be able to operate and maintain today's ships efficiently, safely, and cost-effectively. This requires well-planned and organized human performance initiatives. To this end, it is vital that we design and build learning and performance support solutions that recognize the importance of having well-trained sailors, while balancing cost in terms of ROI. In other words, we need to ensure we are getting the biggest bang for our buck when designing training for the sailor. Critical to this is obtaining stakeholder buy-in on the training solution along the way. Stakeholder buy-in, to the highest levels of management, is an essential factor in creating a successful maintenance program that includes maintenance training as a fundamental element.

In light of current technological advances and reductions in manning levels, it is more crucial than ever that sailors be able to perform more varied tasks and respond quickly to a range of emergent situations. For example, as personnel costs soar, the Navy is designing its future ships, such as the Littoral Combat Ship (LCS), to be more automated and manned by smaller crews. Within these crews, individual sailors need to be generalists or "Hybrid Sailors" and perform duties outside their traditional rate or rating. Hybrid Sailors will be required to possess broader knowledge and understanding (Sea Power, 2006). Increasing job scope and broadening content will make training the Hybrid Sailor more critical and challenging, all of which contribute to increased maintenance effectiveness and reduced TOC.

To this end, it is essential for system and equipment stakeholders to recognize the importance of designing, developing, and integrating human performance support interventions (training and non-training) that provide highly effective and motivational learning solutions. Human performance support interventions are essential, because peak levels of human performance are the result of both training and non-training solutions. Non-training solutions can include electronic performance support systems, job aids, placards, process reengineering, standardized operating procedures, and new tools.

Case Study

Figure 2. LCAC Coming Ashore (AMSEC photo)

In 2011 the Navy's LCAC community designed and implemented a blended learning solution in the Navy's Integrated Learning Environment (ILE) as its first line of defense in combating corrosion and its long-term effects on LCAC craft. Like any training solution, it is intended to provide LCAC crews with the necessary knowledge, skills, abilities, tools, and resources to perform anti-corrosion tasks effectively. In this case, it is also intended to increase readiness, reduce maintenance downtime, and contribute to controlling escalating maintenance costs due to effects of corrosion.

For the LCAC community, training is viewed as a preventive maintenance tool to control and prevent corrosion, increase material readiness, and reduce TOC. Rear Admiral Jim McManamon, the NAVSEA Deputy Commander for Surface Warfare, confirmed the importance of corrosion control training when he said: "The cost of corrosion for Navy ships is almost $2.5 billion per year - almost 25 percent of the Navy's total maintenance budget." The LCAC program and community is out in front of this problem by using craft-specific training to increase its ability to reduce and control corrosion in a preventative, rather than a reactive, maintenance strategy.

Training as a Maintenance Tool

Training should be viewed as any other tool in a toolbox. If you don't have a needed tool to do a job, you either have to get it or improvise, not always a good idea. Cheap tools can be dangerous and unreliable, failing just when they are needed the most. Broken tools are the same as not having tools. A good engineer values a high-quality training program as much as having reliable tools as part of the complete tool box.

Training can seem expensive if the only factors taken into consideration are the cost of developing, delivering, and sending students to training. This may explain why it is common practice to target training as the first thing to be cut when looking for ways to reduce spending. Philosophically, though, this reasoning is flawed. The long-term consequences of cutting training to save costs often lead to less-than-desirable or even catastrophic results. The first and most obvious consequence will become apparent when the knowledge and skills that should have been learned in training are required by the workforce but are not available. The individual who is expected to be ready to operate and/or maintain a system, subsystem or equipment is not adequately prepared. Now consider what happens when the sailor is ill-prepared or under-trained to respond to an emergency at sea. In a worst-case scenario, mission readiness, capability and safety could all be impacted. At best, ineffective maintenance, equipment damage and increased TOC will result. Other training pitfalls that should be avoided include:

- **Assuming that experienced personnel will be available.** Assuming that training is not needed because experienced personnel, who already possess the knowledge and skills needed to perform a job (and do not need training), will be available. Some may believe these same personnel will be able to train the inexperienced sailors on the job. This scenario presents a problem: assuming that experienced personnel will be available when all too often they are not available for a variety of reasons. As a result, a less experienced person is asked to perform the job.
- **Assuming that experienced personnel will have <u>all</u> the required knowledge and skills without conducting detailed analyses to verify**. There is a specific process for determining jobs tasks, training tasks and any gaps that might exist. This process exists to ensure that all the training required to properly operate and maintain expensive and complex Navy equipment is adequately identified – it must be followed.
- **Assuming that experienced personnel would not benefit from training.** Training should be provided to experienced people as well as the novice, especially when there has been a time lag in the application of the knowledge and skills, or when changes have occurred due to the integration of technology into the job.
- **Assuming that ship's personnel and/or subject matter experts (SMEs) make effective trainers.** Poorly or improperly delivered training can be as detrimental as no training at all. Using unqualified trainers may result in inconsistent or inaccurate content delivery, rendering the training outcome uncertain.
- **Assuming that ships can readily find the time to schedule and hold training**. Operational commitments, equipment maintenance (scheduled and unscheduled), and assorted other evolutions make time a valuable commodity aboard ships, resulting in the ships' dependence on training centers and outside activities to provide trained crews.

The most effective training is proactive, predictive, and prescriptive, and when necessary, reactive. Proactive training prepares the student in advance to deal with expected change or difficulty rather than waiting for causality to spur training (Figure 3). Proactive training must be predictive to be effective, since predictive training is based on observation, experience, or objective quality evidence. Prescriptive training is provided, based on analysis, before it is needed so the individual is ready and available with the appropriate knowledge and skills when they are needed. Training could also be reactive, because the unexpected happens, and it is important for personnel to be able to respond quickly and correctly to unexpected or unanticipated events that occur in the workplace.

LCAC Case Study

Figure 3. Training on the proper use of cleaners and preservatives as a preventive measure of corrosion control (AMSEC photo)

LCAC Corrosion Control Training

The LCAC program and community recognized proactively its current corrosion control training was inadequate and needed updating. This realization began a process to analyze what skills were needed by the sailor (Job Task Analysis), identify training currently available (Training Task Analysis), and accomplishes a Gap Analysis to determine if and where training gaps existed. The end result was the Training Needs Analysis (TNA) that identified that a gap existed and current training needed to be updated (The TNA identifies all tasks that need to be trained). Next, using the TNA findings and corrosion control procedures collected from the NAVSEA In-Service Engineering Agent (ISEA), course developers determined the instructional strategies, methods and media for delivering the training to the student in an instructionally valid, efficient, and cost-effective manner. Using this process ensured that the needs of the sailor and the Navy were met and that the training could be standardized for the entire LCAC community, ACU-4 on the east coast and ACU-5 on the west coast.

Characteristics of a Valid and Effective Training Solution

Think of training you have attended in the past that you considered bad. What about it made it bad? What would have been required to make it good training?

Many instructional designers/instructors think they can design and deliver training to adult students in the same way as adolescents. In reality, adult learners do not learn in the same way as children, nor should they be treated the same (Knowles, 2011). The following characteristics should be used to design, develop and deliver valid and effective training for the adult learner.

1. **Training must be relevant.** This means the training meets the need(s) of the student as well as the organization. If students believe the material is not relevant, they are likely to think their time is not being usefully spent and they may not be motivated to persist in the training. The TNA is an important tool that will help ensure content relevance.

2. **Course content must be accurate and up-to date.** If the material is not accurate, the result will be a loss of credibility in the course and its materials. Similarly, course content that is out-of-date will also be perceived as incorrect.
3. **The amount and complexity/difficulty of the course content must be properly targeted.** SME developers have a tendency to aim too high, but aiming too low can be just as problematic. All students need to be motivated, but care should be exercised not to frustrate the student. Providing course content that is too elementary, or content the student already knows, can lead to disinterest. Providing content that is too difficult or complex for the student without proper scaffolding or chunking can be frustrating and results in students who feel incapable of completing the course of instruction. Scaffolding is normally used to provide material in a simple to complex manner which enables the student to master one concept at a time before moving to new material. Chunking is the process where material is provided to the student in manageable sized blocks (chunks) so as not to overload the student. Providing too much content can cause the students to become overloaded; chunking will prevent this. See Figure 4 below for an explanation of these terms.
4. **The training must be targeted to the students.** Target population demographics and experience level (apprentice journeyman, master) must be correctly identified. Remember that all students do not learn the same way, which means that in order to select the proper instructional strategies, methods and media; you must first understand the needs of the student.
5. **Instructional strategies, methods and media selected for training delivery must be appropriate for the student, job, and training context.** The strategy defines the technique or way in which the methods and media are assembled and delivered. The method(s) (instructor-led training (ILT), labs, computer-based training (CBT), Advanced Distributive Learning (ADL), workshops, conferences) and media (PowerPoint, video, computer-aided instruction (CAI), technical training equipment (TTE), training devices (TDs), simulators) selected for delivering the instruction should be targeted for both the content and student.
6. **The training must be high fidelity, that is, believable as a close representation of what the student will encounter in the real world.** Job context, training context, and fidelity should be linked, so that to the maximum extent possible, the training context accurately represents the work context.
7. **Instructors must be credible**. Having instructors with the proper experience, who are properly trained, prepared, and motivated is essential for successful training. An instructor that is not credible can have a negative effect on the training outcome. Technical SMEs may or may not be good instructors and sometimes good instructors are not credible SMEs. Often it may be a good practice to use both in combination; an instructor with an SME for support.
8. **The training must be motivating**. In his 1999 book, *Enhancing Adult Motivation to Learn*, Raymond Wlodkowski says there are four main conditions that teachers and learners should create or enhance to ensure adults are motivated to want to learn:
    a. Build inclusion – The student believes he or she matters and belongs in the training, in large measure because the student believes other students and the instructor value his or her presence.
    b. Create a positive experience – The student finds the training experience worthwhile and would recommend it to others. The student should also feel safe while learning, safe to succeed or safe to fail and try again. For a positive experience, all students must be treated with respect and none should be belittled.
    c. Make the training meaningful – This implies that the student believes that the training is useful and that the time spent in the course was worthwhile.
    d. Engender competence – When training is complete, the student should feel that he or she can and will be able to perform on the job; this is referred to as building self-efficacy.
9. **The training is immediately applied and reinforced**. Repeatedly applying a new knowledge or skill to competency (naturalization) deeply ingrains the learning. Seeing that you are able to do

something successfully engenders competence, as does positive reinforcement. (Negative reinforcement does not engender competence, and should be done privately.) Positive reinforcement makes the training a positive experience.

10. **The training is just-in-time**, meaning it can be applied on the job in a reasonable amount of time - the sooner the better. When not applied, knowledge and skills begin degrading quickly after training is completed. When just-in-time training is not realistic or practical, the blended learning solution should include reach-back or refresher training to mitigate the effects of learning degradation.

There are a variety of strategies that can be used to develop and deliver valid and effective training with these characteristics. One of the most common is to use Gagne's nine events of learning, an instructional design model that provides a relatively easy-to-follow outline for creating instructional content. For additional information on Gagne's nine events, refer to the *EDUTECH WIKI* at: http://edutechwiki.unige.ch/en/Nine_events_of_instruction.

Scaffolding and Chunking

Scaffolding is an instructional technique where complex content is presented using a simple-to-complex progression. When using the scaffolding technique, instruction begins at a level that encourages the student's success and then provides the right amount of support to move the student to each progressively higher level of understanding. (Reigeluth, 1999)

Chunking describes the ability of the brain to perceive a coherent group of items as a single unit or chunk. Chunking is used to separate learning materials into brief sections in order to improve learner comprehension and retention. Chunking develops meaning and therefore facilitates memory and recall. When information is chunked, complex systems emerge out of the smaller sized blocks of material. (Miller, 1956)

Figure 4. Scaffolding and chunking are used to present complex material.

Navy Integrated Learning Environment (ILE)

The Navy ILE provides a standardized process by which training can be designed and developed using a variety of strategies to reach a large and diverse target audience. The ILE ensures the latest technologies are used, when and where appropriate, for today's students. Following ILE guidance helps validate the effectiveness of the training.

To this end, it is important to remember that the right technology, strategy and methods/media have to be selected for the time, place and student. Instructor-led training in a classroom that uses media-rich presentations and the accompanying lab time can be very effective when delivered in a Navy schoolhouse, but it can also be somewhat restrictive because of the cost and time required to send students to the class and maintain the schoolhouse. If student throughput (number of students attending the class per year) is low, building and maintaining a schoolhouse may not be justified and alternative strategies must be explored. Some skills may not be appropriate for all methods. For instance, consider the validity and effectiveness of trying to learn welding from computer-based training (CBT). While CBT may be good for teaching knowledge about welding and for illustrating concepts and practices, it would be less than ideal for teaching and practicing the hands-on art of running an arc. In this case, a blended solution might be the best answer.

The ILE Manual (NAVEDTRA 136), defines the ILE as a collection of automated information systems that use information technology to streamline training processes, automate learning management functions, and deliver training using electronic means to the Navy's Total Force in the schoolhouse, while deployed or at home. The ILE supports readiness by enhancing institutional and individual learning for the Total Force. The system provides near-term and long-term infrastructure to enhance human performance and learning specifically in the areas of rate, rating, and Navy Enlisted Classification (NEC). The infrastructure includes the hardware, software, communications, information technologies, and associated networks. ILE is an integral component of the DoD Advanced Distributive Learning (ADL) initiative and the strategic plan for transforming DoD training, which calls for the full exploitation of technologies to support quality education and training. ILE supports DoD and Navy business transformation priorities and strategy by enabling intra-Navy sharing of learning data, adopting commercial practices and products to reduce operating costs, and using the web to provide increased access to course materials. An important part of the ILE is the R3 concept:

- Reuse
- Repurpose
- Reference

The purpose for the R3 concept is to streamline training design and development processes and standardize training content. Design and development processes are streamlined when existing content is reused, repurposed, or referenced rather than created new for each course or venue. The R3 concept is also beneficial because it standardizes training content across courses and venues. When training content is standardized it is easier to manage and update/revise because a single Learning Center and Course Curriculum Model Manager is responsible for the content. To the maximum extent possible, every attempt should be made to abide by the three Rs of the ILE when designing and developing learning content. This means when designing learning, strategies, methods and media should be selected that can be reused, repurposed and/or referenced by other Navy training (Figure 5).

Figure 5. The ILE encourages using current technologies (e.g., computer- and web-based training) and best practices (e.g., instructor-led training with labs and practical application) to reach a larger student audience. (AMSEC photos)

Blended Learning Solution

A blended learning solution is achieved when multiple methods and media are incorporated (blended) into the final training strategy. Learners do not always learn in the same way, nor do all contexts require the same solution. A blended solution is beneficial because it can appeal to a variety of learners and learning styles. For example, some learners may prefer to read the technical manual before any attempt is made to learn or apply a new skill; others may prefer to watch someone else do the task before attempting it; while yet others will have the "let me do it" attitude and just want to jump in and do it. Another benefit of a blended learning solution is that it can be used to fulfill the needs of differing job or training contexts. Consider a brick and mortar schoolhouse course of 26 weeks that includes classroom time and lab time. Analysis indicates course "seat time" can be shortened by placing some of the knowledge elements into a CBT or ADL format, leaving classroom time for only the most critical components of instruction that require facilitated skill practice and demonstration. The advantages of this solution are that it saves on schoolhouse costs (facilities and instructors), student costs (travel, per-diem, and housing) and the sailor is away from the command for a shorter period of time. Another benefit for the blended solution is that computer and web-based training offers access by very large target audiences – the only requirement is that the students have access to a computer and the World Wide Web. With such access they can take the training at their own pace, when and where it is convenient.

LCAC Case Study

The LCAC Corrosion Control Training Course was designed and developed to be ILE-compliant and to contain many of the attributes discussed in the Characteristics Section above. Before development began, the course outline of instruction, learning objectives, and flow charts were approved by all stakeholders. Development was accomplished with the LCAC SMEs and NAVSEA (ISEA) reviewing and approving the course content at each step along the way. Since each ACU was separately hosting CC training in its own training facilities, it was determined that the best solution would be to continue to host the training at each command, where the students are immediately available and the training would be just-in-time. It was also determined that the training would be a blended solution of ILT in a classroom with computer aided instruction (CAI) and hands-on training on actual equipment. This methodology allows the student to gain conceptual knowledge in the classroom and then immediately use the newly acquired knowledge and skills in a supervised lab environment where they can be practiced and reinforced to competency.

The LCAC CC training is also a blended learning solution because it offers the student a variety of ways by which to learn and practice the material. The classroom portion of the training is delivered as instructor-led, CAI to help with knowledge and concept attainment (Figure 6). The focus also included developing relevant hands-on training where the student can practice the skills (under supervision and with immediate feedback) to the desired level of competency before applying the skills on-the-job (Figure 7). Since the LCAC CC training is delivered at the Organizational level, transfer of the knowledge and skills to the workplace should be immediate. For knowledge and skills that are not used often, reach-back and refresher training will be available on NKO or by Compact Disk. Offering the same training at both ACUs ensures that context delivery and material will be consistent across the LCAC community. The ultimate goal is to reduce maintenance costs and TOC by raising awareness and applying consistent maintenance procedures on both coasts.

Figure 6. Instructor-led training in a classroom using computer-aided instruction. (AMSEC photo)

Figure 7. Students receive hands-on corrosion inspection training with immediate feedback from the instructor. (AMSEC photo)

The ILT portion of the class was developed using AIM-II, version 4.0, which is the latest Navy authoring tool[1] and outputs ILE-compliant courseware. Expeditionary Warfare Training Group-Pacific (EWTGPAC) was the Navy approval authority for the courseware. Developing the course in AIM

[1] An authoring tool is a software program that helps developers create training materials by linking together objects, such as learning objectives, content, and graphics. By defining the objects' relationships to each other, and by sequencing them in an appropriate order, authors can produce valid and effective training applications.   Most authoring systems also support a scripting language for more sophisticated applications.

ensures that it is standardized and cost effective over its life cycle because it is available for reuse, repurposing, and referencing (R3) as required by ILE guidance. In keeping with the R3 philosophy of training development, the CAI developed to support the ILT was not only ILE-compliant but also Shareable Content Object Reference Model (SCORM) compliant. SCORM compliance is an added design and development integration that makes the course compatible for hosting on NKO where it can be used as CBT/WBT for initial training, but also reach-back/refresher training.

Return on Investment

The goals of increasing material readiness and reducing TOC for the LCAC will be accomplished by continually educating LCAC personnel with regard to understanding and recognizing the causes and effects of corrosion, including prevention measures and mitigation techniques.

Since this training was only recently implemented, mature data are not yet available to prove that the training is increasing material readiness while reducing maintenance and TOC. The ISEA commented that he expects these data would be tracked and collected using the Sustainment and Readiness Model (SuRM)/Pro-Opta Model and Corrosion Trend Analysis Report (CTAR). SuRM is a program built by Sandia National Labs for the NAVSEA LCAC Program Management office (PMS 377) that tracks OPNAV 4790/2-Kilo (Ship's Maintenance Action Form) readiness data to determine readiness drivers that should allow optimization analysis. CTAR is produced by the Boston Planning Yard and is used to track data from the semi-annual corrosion control inspections. The ISEA also stated that when corrosion control training was instituted for the LCACs around 1995, the number of reported 2-Kilos doubled. This can be misunderstood to cause an increase in maintenance dollars spent when the reality was that follow-on problems were not being identified and the level of problems was brought down to a more manageable deck plate level. As a result, there was (and will be) an increase in the amount of money spent on preventive measures, such as consumables. The ISEA anticipates that the impact will initially show up as an increase in maintenance dollars spent during the first year or two. Initial corrosion control maintenance reporting during the first year may not show an impact on craft condition as most of the repairs will be to pre-existing damage, and there will be an increase in money spent on consumables. The returns will begin to be realized during the third year when a significant drop in maintenance tasks can be expected. The drop in the third year should correspond to an increase in overall craft material condition of readiness.

Conclusion

The cost of combating and correcting maintenance related problems on Navy ships runs into billions of dollars every year; the cost of combating corrosion alone was almost $2.5 Billion in 2010. Training is a necessary and essential tool that can increase material readiness and reduce TOC. In today's highly competitive fiscal environment, it is essential that stakeholders and organizations fight for and defend their share of the training budget. Neglecting training, or not recognizing its value as a preventive maintenance tool, can lead to catastrophic and costly consequences.

For the LCAC community, this training was paramount to increased awareness and success in recognizing, preventing and mitigating the effects of corrosion. The ACUs can expect to achieve measureable positive results from their investment of time and training dollars to address corrosion problems on their craft. With a well-trained and motivated crew monitoring and responding to corrosion issues, the LCAC fleet should enjoy a greatly improved material condition and the accompanying increase in readiness, availability and capability.

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Author Bios

Maurice (Reese) Hartey, who has worked for NAVSSES since 1983, is currently the ILS Program Manager. He started his civil service career at NAVSSES in what was then Division 05, the Measurements and Materials Division (now code 60), where he worked on damage control and fire suppression systems. He moved to the Submarine Sail and Antenna Division 96 where he became the ILS Section Head and developed what was to later become the Logistic Product Advocate (LPA) concept. While in Division 96, he was instrumental in ensuring that logistic support became a part of everyday business practices in the division. He next transferred to Propulsion and Power Systems Division 93 where he expanded the LPA concept to that division and through command-wide ILS teams began developing LPAs throughout the command. Notable programs managed in Division 93 were the “get well” logistic program for marine gas turbine engines and the Product Improvement Program for the Isotta Fraschini (IF) engine used in the Mine Warfare community. Mr. Hartey was transferred to Programs & Platforms Division 91 in 1998 to become the ILS lead for all Surface Combatant HM&E programs. Here Mr. Hartey redefined logistic support for the Surface Combatant community and was awarded the NAVSEA Logistician of the Year award in 2001 in recognition of his efforts. In 2003 Mr. Hartey was transferred into his current position as the Command Station Integrated Logistic Support and New Acquisition ILS Program Manager across the command.

Arlene M. Korn is Program Manager for Acquisition Logistics Program at NDI Engineering Company, Philadelphia, PA. Ms. Korn has been providing logistics support and program management as a contractor for 11 years. She was formerly in civil service with the Naval Inventory Control Point (formerly ASO) for 16 years before becoming a contractor. She holds a Bachelor of Science from Holy Family University, Philadelphia, PA.

Kevin P. Kennedy is the Program Manager for Instructional Systems Design (ISD) at Huntington Ingalls Industries-AMSEC, Hampton, VA. With AMSEC for 20 years, he is the ISD Project Manager for CVN 78 and other tasks. Retired from the U.S. Navy as a Senior Chief Engineman, he is a NAVSEA-certified Diesel Engine Inspector with 22 years of service. He has a Master of Science in Instructional Systems Technology from Indiana University and a Bachelor of Science in Workforce Education and Development from Southern Illinois University.